ADL-1164

Semi-conductor Air Quality (VOC) Sensor/ Data Logger

Serial No.

User Manual

December, 2010

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GAADL1164_E_1210

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Data Logger with Semi-conductor Gas Sensor for Air Quality (VOC)

1 Indended Use

The data logger is used for recording the air quality, VOC (Volatile Organic compounds), in indoor areas.

The intended sites are all areas within the ambient conditions as defined in the Technical Data.

The data logger must not be used in potentially explosive atmospheres.

2 Functional Description

2.1 VOC Sensor

Inside the used semi-conductor gas sensor, shortly called MOS (Metal Oxide Sensor), the electric resistance of the heated, semi-conducting sensor coating is changed by the presence of Volatile Organic Compounds (VOC).

The VOC concentration in indoor areas is mainly determined by the persons who are present and by their activities. VOCs are released for example when working with cleaning agents or when cooking, but even the breath is a constant source of volatile metabolic products (VOCs). The air quality module detects the increasing VOC level and calculates the proportional CO_2 value. The VOC/ CO_2 correlation has been determined by measurements under real conditions.

Initial phase of new sensors:

New sensors run through a burn-in period within the first 6 hours. During this phase the sensing resistor passes through a maximum, but no measurement is effected. A pre-set VOC value is output instead.

A voltage break during the burn-in process resets the hour meter from 6 to 0 and the burn-in process restarts anew.

Start-up behaviour:

Each time the sensor is switched on, it runs through a warm-up period of 15 minutes. During this warm-up period there aren't any measurements, the sensor emits the signal of 50% of the measuring range.

After the warm-up period the sensor takes the currently read VOC value as zero-point, independently from the actual concentration. Therefore after the warm-up period, the ambient air should be of low VOC content. This can be obtained by short venting at the beginning of the metering or by taking the logger to an environment with low VOC concentrations for 5 minutes.

The VOC sensor reacts to variations in humidity with up to 70 ppm per % RH, therefore the humidity and temperature must have the same level as at the measuring site.

Measurement:

If the sensor isn't started at low VOC concentrations, it can take a couple of days until the internal algorithm has adjusted the zero-point so far that there are valid measuring results. The natural drift of the MOS is corrected automatically by the integrated drift correction.

The VOC concentration is the amount of a variety of substances.

A basic motion of the air is favourable to get optimum measuring results.

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2.2 VOC Data Logger

The VOC sensor is supplied by an internal maintenance-free 6 V rechargeable battery. At full charge the operating time is about 90 hours, but the deep discharge protection switches automatically to off when reaching the deep discharge voltage of 5.5 V.

The data logger T-Logg 120 is supplied – independently from the rechargeable battery – by a separate battery with a lifetime of 3 years. The data stored in the T-Logg survive, however, in the internal memory and aren't lost.

Further information can be taken from the User Manual T-Logg 120.

The sensor measures the VOC content in the range of 450 – 2000 ppm. The measured value is transmitted to the T-Logg 120 in 0 – 5 V signal form, 0 V corresponding to 450 ppm and 5 V corresponding to 2000 ppm. The T-Logg 120 records the data according to the set definition. See XXXX.

In mode switch OFF position, the VOC sensor is voltage-free; the sensor output signal is 0 V. The T-Logg 120 interprets 0V as Low Alarm. The display changes between 450 and LoAl. In Low Alarm status there is no recording.

450 ppm <> LoAL = VOC sensor not active.

The recording is started via the operating mode switch when brought to position "Record". The VOC sensor emits a 2.5 V signal (T-Logg display 1225 ppm) for 15 minutes and then starts the real measurements.

T-Logg configuration:

Display range: 450 – 3550 ppm

Measuring range: 0,0 V – 10.0 V. (Output signal VOC sensor = 0 V (450 ppm) to 5 V (2,000 ppm), therefore limitation of the display range to 3550 ppm.)

Alarm Min. 460 ppm. Measuring signal < 460 ppm = No recording.

Alarm Max: 3551 ppm Measuring signal > 10 V = Fault in the measuring system.

Start of recording: If no alarm is active.

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3 Commissioning/ Measuring

3.1 Pre-arrangements Data Logger

Prior to starting the records, the 6 V lead battery has to be charged by means of the charger ALCS 2-24A according to the IU characteristics. The ALCS is connected to the socket “Charging” with the jack plug. The charging voltage as well as the charging itself is automatically regulated and monitored. The green LED signals the charging voltage (6V).The charging is shown by the red LED “Charge”. Only if this LED goes out, the battery is fully charged.

The ALCS is suitable for the trickle charge as well as for stand-by and parallel operation.

The operation mode switch should be in OFF position during charging for fast charging.

Only after full charge of the battery, the maximum operating time of 90 hours can be obtained.

In the position “Record” of the operation mode switch, the VOC sensor is supplied by the battery, so the discharge starts immediately. Therefore it is advisable to bring the switch into position “Record” only when starting the recording.

Prior to recording, the configuration, as well as time and date are checked and corrected at the T-Logg 120 by means of the software MINSOFT.

Then the data from the last recording are deleted and the records are started anew.

3.2 Positioning

The VOC Data Logger must be situated in a way so that the gas inlet is not blocked. The data logger should only be located in areas with low streams of air to get exact results. Corners, niches and areas with intense streams of air have to be avoided.

3.3 Commissioning

After positioning the Data Logger, the recording is started by turning the operation mode switch to position “Record”. The display changes from 450 <>LoAl to 1225 ppm. After 15 minutes, the measurement of the current VOC concentration starts.

3.4 Readout and Processing of the Data

The data are readout with time and date stamp via the supplied serial USB interface by means of the software MINSOFT. This procedure as well as the data processing can be taken from the User Manual T-Logg 120.

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4 Specifications

Electrical	
Supply voltage	5 V DC
Power consumption	Ca. 30 mA
Sensor data	
Gas type	VOC (alcohols, aldehydes, aliphatic hydrocarbons, amines, aromatic hydrocarbons, carbon monoxides, methane, LPG, ketones and organic acids)
Sensor element	Semi-conductor
Measuring range	450 – 2,000 ppm
Accuracy	± 150 ppm
Repeatability	± 5 % of reading
Response time	$t_{90} \leq$ 60 s
Correct function after switch-on	15 min
Expected life time	> 10 years/ normal ambient conditions
Output signal	
Analog output signal	0 – 5 VDC proportional
Ambient conditions	
Humidity	15 – 90 % RH non condensing
Temperature	0 °C to + 50 °C
Temperature storage	5 °C to + 50 °C
Pressure range	Atmosphere ± 10 %
Battery data	
Voltage	6 VDC
Capacity	2.8 Ah
Supply duration	ca. 90 h at full charge
Deep discharge voltage	5.5 V
Type	Lead battery
Charger	
Supply voltage	230 VACV/ 50 Hz
Output voltage	2, 6, 12, 24 VDC (automatic adjustment to battery)
Charging characteristics	IU
Trickle charge	ca. 20 mA
Capacity range	2.4 – 24 Ah
Charging current	700 mA at 6 V
Physical	
Housing	Polycarbonate
Flammability	UL V94
Colour	RAL 7032 (light grey)
Dimensions	(B x H x T) 97 x 130 x 81 mm
Weight	Ca. 0.95 kg
T-Logg 120	See User Manual T_Logg 120
Directives	EMC Directives 2004 / 108 / EEC
Warranty	1 year on material (without sensor)

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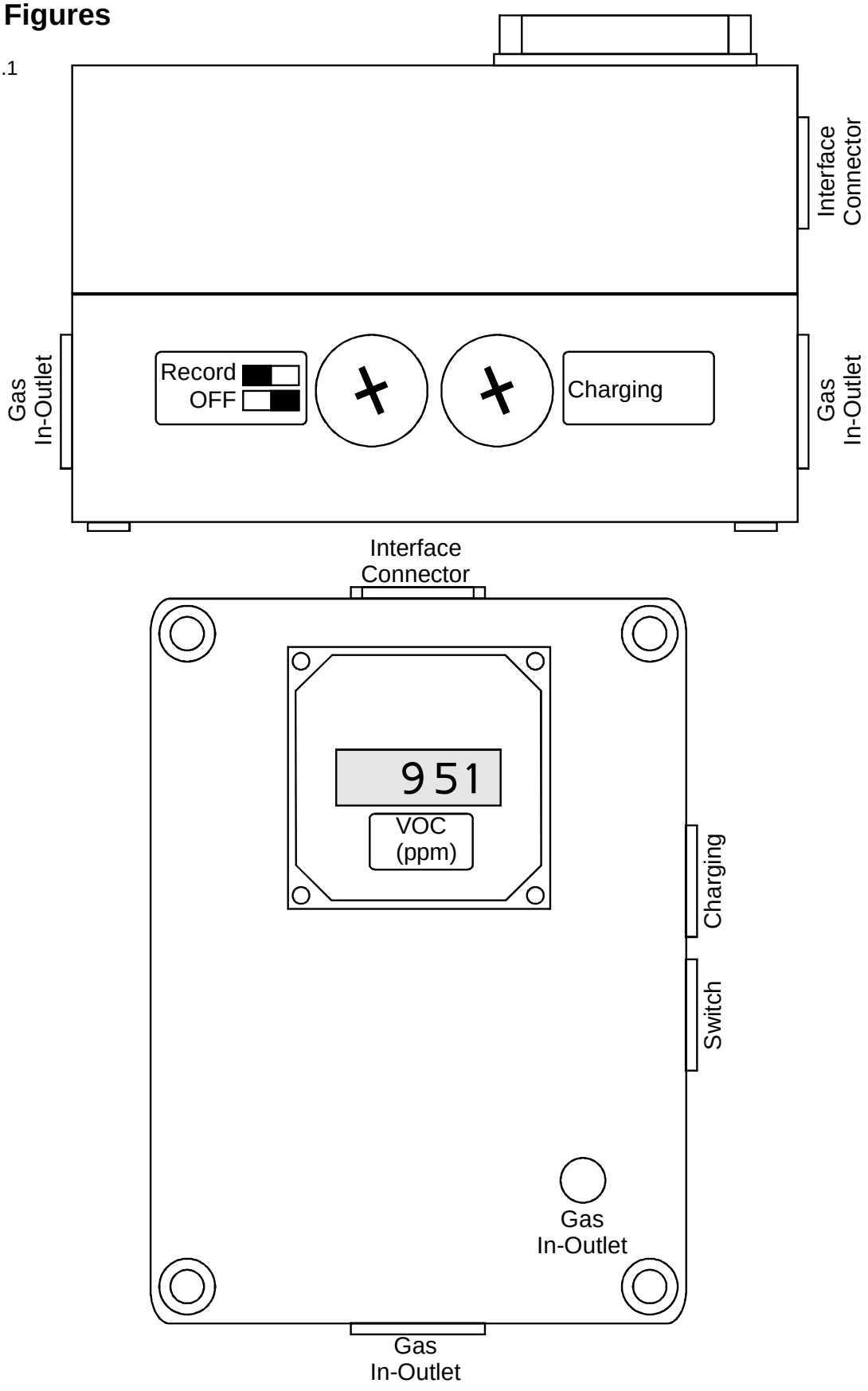
5 Figures

Fig.1



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6 Notes and General Information

For the installation of the device and the operation, it is important to read this user manual thoroughly. The ADL must be used within product specification capabilities. The appropriate operating and maintenance instructions and recommendations must be followed.

Due to on-going product development, MSR reserves the right to change specifications without notice. The information contained herein is based upon data considered to be accurate. However, no guarantee is expressed or implied regarding the accuracy of this data.

6.1 Intended Product Application

The ADL is designed and manufactured for control applications, energy-savings and air quality compliance in commercial buildings and manufacturing plants.

6.2 Installers' Responsibilities

It is the installer's responsibility to ensure that the ADL is installed in compliance with all national and local codes and OSHA requirements. Installation should be implemented only by technicians familiar with proper installation techniques and with codes, standards and proper safety procedures for control installations and the latest edition of the National Electrical Code (ANSI/NFPA70). It is also essential to follow strictly all instructions as provided in the user manual.

6.3 Maintenance

It is recommended to check ADL regularly. Due to regular maintenance any performance deviations may easily be corrected. Re-calibration and part replacement in the field may be implemented by a qualified technician and with the appropriate tools. Alternatively, the ADL may be returned for service to MSR-Electronic-GmbH.

6.4 Limited Warranty

MSR-Electronic-GmbH warrants the ADL for a period of one (1) year from the date of shipment against defects in material or workmanship. Should any evidence of defects in material or workmanship occur during the warranty period, MSR-Electronic-GmbH will repair or replace the product at their own discretion, without charge.

This warranty does not apply to units that have been altered, had attempted repair, or been subject to abuse, accidental or otherwise. The warranty also does not apply to units in which the sensor element has been overexposed or gas poisoned. The above warranty is in lieu of all other express warranties, obligations or liabilities.

This warranty applies only to the ADL. MSR-Electronic-GmbH shall not be liable for any incidental or consequential damages arising out of or related to the use of the PolyGard® transmitters.

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